Irrigated Lands Regulatory Program

Existing Conditions Report
Executive Summary

December 2008

Prepared For:

Central Valley Regional Water Quality Control Board

11020 Sun Center Drive #200
Rancho Cordova, CA 95670

Prepared By:

ICF Jones & Stokes
an ICF International Company

630 K Street, Suite 400
Sacramento, CA 95814

Irrigated Lands Program
EXISTING CONDITIONS REPORT
EXECUTIVE SUMMARY

The jurisdiction of the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) extends from the Oregon border to the northern tip of Los Angeles County and includes all or part of 38 of the State's 58 counties. The three major watersheds delineated within this region are the Sacramento River Basin, the San Joaquin River Basin, and the Tulare Lake Basin (Figure ES-1). The three basins cover about 40% of the total area of the State and approximately 75% of the irrigated acreage (Central Valley Water Board 2002). Much of the surface water supplies in the Central Valley originate north of the Sacramento–San Joaquin River Delta (Delta), while much of the water use is south of the Delta. While there is plenty of surface water in the Sacramento River Basin to meet the present level of demand, surface water supplies in the San Joaquin River and Tulare Lake Basins are inadequate to support the present level of agriculture and other development. In these basins, imported water as well as groundwater resources are being used to meet existing water supply demands.

The crests of the Sierra Nevada Mountains on the east and the Coast Range and Klamath Mountains on the west border the Sacramento and San Joaquin River Basins. Surface waters from these two basins meet and form the Delta, which ultimately drains to the San Francisco Bay. Major groundwater resources underlie both river valley floors.

The Existing Conditions Report (ECR) has two central purposes. First, the information is intended to support the development of a long-term irrigated lands regulatory program that will minimize the effects of discharges from irrigated agricultural land into waters of the state. Secondly, the information on current land uses and surface and groundwater quality in the Central Valley has been compiled to act as a baseline from which the environmental effects of various nonpoint source (NPS) regulatory control programs can be evaluated. The information collected to support these two purposes includes:

A comprehensive survey of readily available and relevant digital coverage for the entire Central Valley in a geographic information systems (GIS) format:

- topography,
- land use cover,
- water bodies,
- watershed boundaries,
- political boundaries, and
- major roadways.

A comprehensive study of readily available existing information related to water quality observations within each of the watersheds:

- general watershed parameters (acreage, land uses, major tributaries, flows, etc.),
- status of water quality conditions as listed in 2006 Section 303(d) of the Clean Water Act (CWA) (impaired water body list) all 303(d) references are for the 2006 listing,
- water quality data from the United States Geological Survey (USGS), Department of Water Resources (DWR), and the Central Valley Water Board (Water Board), among others,
- constituents (wastes and/or pollutants that affect water quality) of concern, and
- discharge pathways and sources of wastes and/or pollutants (to the extent known).

A general description of groundwater conditions in the Central Valley Water Board's jurisdictional area:

- general basin and sub-basin parameters (acreage, land uses, major tributaries, flows, etc.),
- known water quality issues of each of the groundwater basins (basin boundaries from bulletin 118),
- constituents (wastes and/or pollutants that affect water quality) of concern, and
- discharge pathways and sources of wastes and/or pollutants (to the extent known).

Information regarding the current understanding of management practices employed by managers of irrigated lands and wildlife management areas is also provided. The information on management practices is focused on what proven management practices are available to land managers, including an effort to interview a subset of land managers regarding what practices are being used.

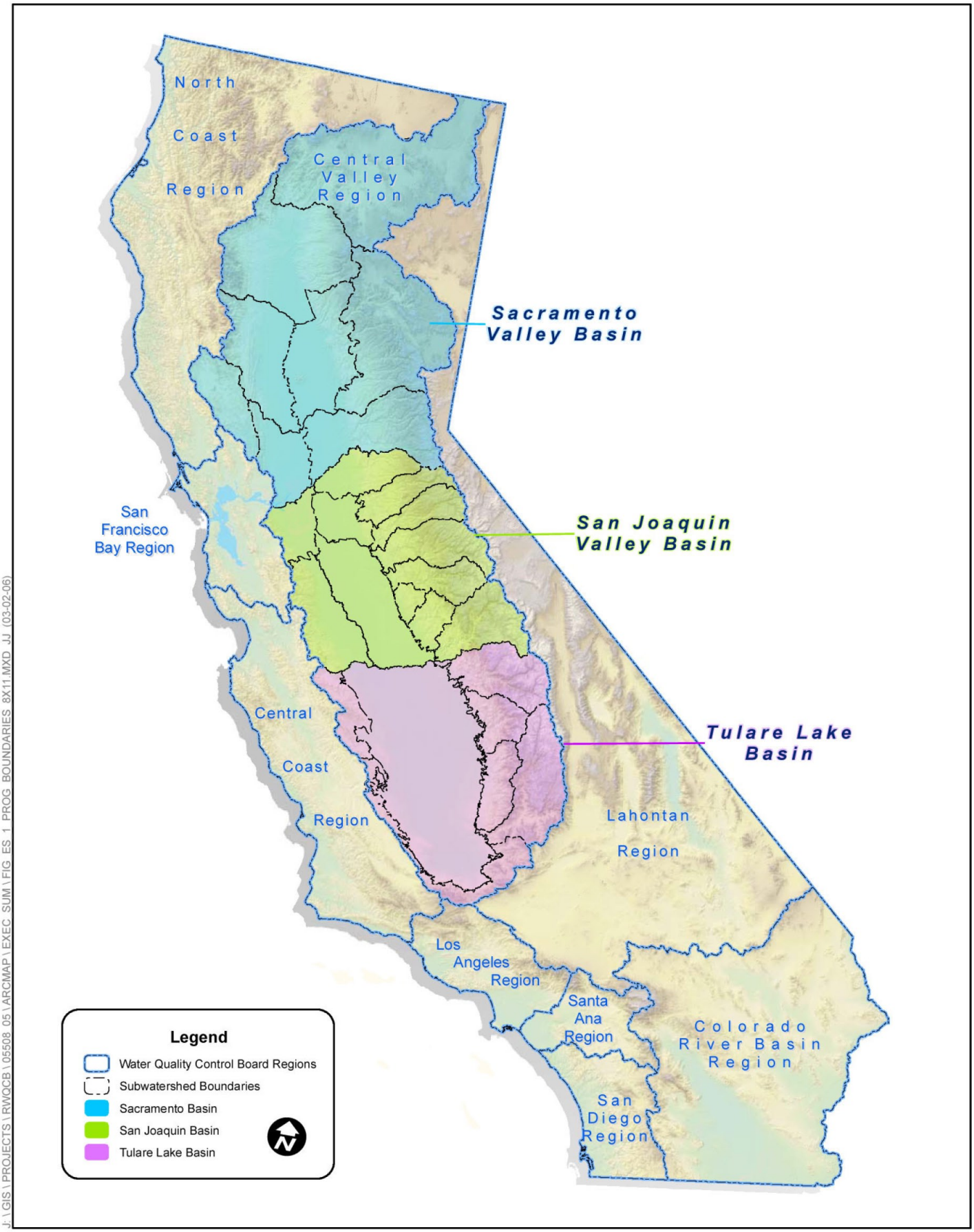
The information in the ECR provides the basic physical and regulatory setting information needed to prepare an Environmental Impact Report for a long-term irrigated lands regulatory program. There are many land management practices that can reduce the influence irrigated agriculture and wetland management have on the quality of the waters of the state. Many of these practices are being implemented throughout the Central Valley, yet there is little data on which practices are being used on which parcels and quantification of the benefits remains elusive.

Geography and hydrology are markedly different in the Sacramento River, San Joaquin River, and Tulare Lake Basins. Climate, water availability, and topography all play important roles in how irrigation water is applied and managed, including the discharge and reuse of irrigation return flows. Any long-term irrigated lands regulatory program will need to be flexible enough to account for these differences. While the jurisdictional area of the Central Valley Water Board encompasses nearly 40% of the State, much of that area does not have impairments in water quality due to irrigated agriculture.

A summary of the information contained in the ECR is provided below.

REGULATORY SETTING

Surface water and groundwater quality are regulated in California through many laws, regulations, and ordinances administered by local, state, and federal agencies. Water quality regulation and permitting processes are designed to limit the discharge of wastes and/or pollutants to the environment in an effort to achieve the highest surface and groundwater quality, protect fish and wildlife and their habitats, and



J:\GIS\PROJECTS\RWQCB\05508_05\ARCMAP\EXEC_SUM\FIG_ES_1_PROG_BOUNDARIES_8X11.MXD JJ (03-02-06)

ICF Jones & Stokes
an ICF International Company

Figure ES-1
Program Boundaries and Subdivisions

protect other beneficial uses (e.g., domestic and agricultural water supply and recreational resources). Any proposed long-term irrigated lands regulatory program must be designed implement the requirements of the California Water Code and Central Valley Water Board Water Quality Control Plans, or Basin Plans. (California Water Code 2008; Central Valley Water Board 2002b, 2004b, 2007b.)

This chapter of the ECR describes the regulations relevant to irrigated lands where water is applied for the purpose of producing crops. These crops include, but are not limited to, land planted to vineyard, row, pasture, field and tree crops, commercial nurseries, nursery stock production, managed wetlands, rice production, and greenhouse operations with permeable floors that do not currently discharge under waste discharge requirements (WDRs), National Pollutant Discharge Elimination System (NPDES) permits, Municipal Separate Storm Sewer System permits, or other NPDES permits within the State of California.

Federal Programs Affecting Irrigated Lands Discharges

The federal Clean Water Act (CWA) was established to regulate discharges of pollutants into waters of the United States. The CWA requires permits for all point source discharges, construction related discharges, and direct discharges of fill into or excavations from within a water of the United States, including wetlands.

Water runoff from irrigated cropland may contain pollutants that ultimately reach waters of the United States. Starting in the late 1980s, the U.S. Environmental Protection Agency (EPA) has led efforts to address polluted runoff, i.e., nonpoint sources that are responsible for the majority of water quality impairments in the nation. However, agricultural sources are not subject to CWA permits or other regulatory requirements under federal law. Under Section 319 of the CWA, the assessment and management of NPS pollution, including agricultural runoff, is the responsibility of the states.

Section 319 requires that each state produce an NPS assessment report that identifies the waters in that state that are impaired or threatened by NPS pollution and the sources contributing to the impairment. Under Section 319, the state must also identify the best management practices or measures to be used to control each pollution source identified (NPS management program) and specific criteria that define successful pollution control practices and measures. The EPA reviews and provides final approval for each state's NPS management program.

State Programs Affecting Irrigated Lands Discharges

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) establishes the State Water Resources Control Board (State Water Board) and divides the state into nine regions, each with a Regional Water Quality Control Board (Regional Water Board). The State Water Board and nine Regional Water Boards are the primary state agencies responsible for protecting the quality of the state's surface and groundwater resources.

The Porter-Cologne Act authorizes the State Water Board to develop state policies regarding water quality. In addition, the Porter-Cologne Act (Section 13263) authorizes the State and Regional Water Boards to issue individual and general waste discharge requirements, and to conditionally waive waste discharge requirements, for projects or activities that discharge waste that could affect the quality of the waters of the state. The Porter-Cologne Act requires that the State Water Board or the Regional Water Boards adopt Basin Plans for the protection of water quality. A Basin Plan must identify beneficial uses

of water to be protected, establish water quality objectives for the reasonable protection of the beneficial uses, and establish a program of implementation for achieving the water quality objectives.

Central Valley Regional Water Quality Control Board Interim Conditional Waiver Program

In 2003 the Central Valley Water Board adopted a conditional waiver of waste discharge requirements for discharges from irrigated agricultural lands. As part of the 2003 waiver program the Water Board directed staff to prepare an Environmental Impact Report (EIR) for a long-term irrigated lands regulatory program. The 2003 interim waiver program was set to expire in 2006. In 2006, the Regional Water Board adopted a new conditional waiver for discharges from irrigated agricultural lands that continued the 2003 interim program until 2011. In the 2006 conditional waiver, the Regional Water Board reaffirmed the goal to develop a long-term program and EIR.

The 2006 waiver program, or interim program, requires that growers comply with applicable water quality standards (e.g., chemical, bacterial, salt standards), protect beneficial uses (e.g., aquatic life, drinking water) and prevent nuisance. Growers must implement practices to protect water quality, conduct water quality monitoring, evaluate the effectiveness of management practices, and change practices to improve water quality where problems are identified.

California State Water Resources Control Board— Nonpoint Source Pollution Control Program

The California Water Code Section 13369 requires that the State Water Board in consultation with the California Coastal Commission and other appropriate agencies, prepare a detailed program for the purpose of implementing and enforcing the state's nonpoint source (NPS) management plan.

The California State Water Resources Control Board NPS Implementation and Enforcement Policy adopted in 2004 establishes requirements on how to develop, structure, and enforce a NPS pollution control implementation program, which fulfills the requirements of Water Code Section 13369(a)(2)(B). Above all, the program that is implemented needs to contain provisions that will lead to an improvement in water quality and the attainment of applicable Basin Plan assigned beneficial uses (e.g., municipal supply, aquatic life) for all water bodies of the state.

SURFACE WATER QUALITY

Organization and Elements

The Central Valley Region is divided into three major surface water basins: the Sacramento River Basin, the San Joaquin River Basin, and the Tulare Lake Basin (Figure ES-1). Each of these three basins is divided into Watersheds delineated by the California Department of Water Resources (DWR) CalWater boundaries (Figures ES-1). The Watersheds in each of the three basins are listed below.

Of the 30 Watersheds that comprise the Sacramento River, San Joaquin River, and Tulare Lake Basins, 12 have water bodies that are 2006 303 (d) listed as impaired due to agriculture. Pursuant the interim

waiver program, water quality management plans are required where water quality monitoring shows two or more exceedances of applicable water objectives. There are water bodies in 14 Watersheds for which management plans are being required; all eight Watersheds of the Sacramento River Basin, five Watersheds of the San Joaquin River Basin, and 1 Watershed of the Tulare Lake Basin. All areas in the jurisdiction of the Central Valley Water Board are described in the ECR.

Sacramento River Basin

The Sacramento River Basin covers 27,210 square miles. The principal streams in the basin are the Sacramento River and its larger tributaries: the Pit, Feather, Yuba, Bear, and American Rivers to the east; and Cottonwood, Stony, Cache, and Putah Creeks to the west. Major reservoirs include Shasta, Oroville, and Folsom. Of the eight Watersheds within the Sacramento River Basin, only one Watershed does not contain a water body that is 303 (d) listed as impaired from irrigated agriculture: the Upper Feather–Upper Yuba Watershed. However, there are management plans being required for water bodies in all eight Watersheds. The Watersheds of the Sacramento River Basin are:

1. Pit River Watershed
2. Shasta-Tehama Watershed
3. Butte-Sutter-Yuba Watershed
4. Upper Feather River–Upper Yuba River Watershed
5. Lake-Napa Watershed
6. Colusa Basin Watershed
7. Solano-Yolo Watershed
8. American River Watershed

San Joaquin River Basin Watershed

The San Joaquin River Basin covers 15,880 square miles. The principal streams in the basin are the San Joaquin River and its larger tributaries, including the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs include Pardee, New Hogan, Comanche, Millerton, McClure, Don Pedro, and New Melones. The San Joaquin River Basin is delineated into 12 Watersheds. Of these 12, four include 303 (d) listed water bodies impaired for pollutants from irrigated agriculture while management plans are required for water bodies in five Watersheds as a result of monitoring under the current irrigated lands regulatory program. The four listed Watersheds and the additional Watershed requiring a management plan are; the Delta-Mendota Canal Watershed, Delta-Carbona Watershed, San Joaquin Valley Floor Watershed, North Valley Floor Watershed, and the Coast Range Watershed. The remaining basins are all in the upper elevations, typically above the valley floor. The Watersheds in the San Joaquin River Basin are:

1. Delta-Mendota Canal Watershed
2. San Joaquin River Watershed
3. San Joaquin Valley Floor Watershed
4. Delta-Carbona Watershed
5. Ahwahnee Watershed
6. Mariposa Watershed

7. Upper Mokelumne River–Upper Calaveras River Watershed
8. Merced River Watershed
9. North Valley Floor Watershed
10. Stanislaus River Watershed
11. Tuolumne River Watershed
12. Cosumnes River Watershed

Tulare Lake Basin

The Tulare Lake Basin comprises the drainage area of the San Joaquin Valley south of the San Joaquin River and encompasses approximately 17,650 square miles. The valley floor includes slightly less than one-half the total basin land area. The Kings, Kaweah, Tule, and Kern Rivers, which drain the west face of the Sierra Nevada Mountains, provide the bulk of the surface water supply native to the basin. Major reservoirs are Pine Flat, Kaweah, Success, and Isabella. Imported surface water enters the Basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and the Delta-Mendota Canal. Of the 10 Watersheds in the Tulare Lake Basin, only one Watershed contains a water body that is 303(d) listed as impaired from irrigated agriculture; also, a water quality management plan is required for this same Watershed under the current irrigated lands regulatory program. This Watershed comprises the entire valley floor and is called the South Valley Floor Watershed. The Watersheds of the Tulare Lake Basin are:

1. Kings River Watershed
2. Kaweah River Watershed
3. Kern River Watershed
4. South Valley Floor Watershed
5. Grapevine Watershed
6. Coast Range Watershed
7. Fellows Watershed
8. Temblor Watershed
9. Sunflower Watershed
10. Southern Sierra Watershed

GROUNDWATER QUALITY

Organization and Elements

The discussion of groundwater quality in each basin is organized by groundwater basin and subbasin. The groundwater basins within the Sacramento River, San Joaquin River, and Tulare Lake Basins of the Central Valley have been delineated using the boundaries contained in DWR Bulletin 118.

Each subbasin is discussed individually. The subbasin sections include a general physiographic and hydrogeologic description that includes information about groundwater recharge and discharge mechanisms, subsurface lithology, and groundwater bearing zones. To the extent available, the sections

also include information about land use, water agencies and purveyors; the status of groundwater level changes; and any ordinances that may affect groundwater supply or quality. Data regarding groundwater quality has been included to the extent available for nutrients, pesticides, salinity, trace elements, and drinking water constituents of concern.

The available water quality data is discussed in the context of agricultural irrigation-related processes affecting the distribution and concentration of individual constituents. This includes description of possible discharge pathways for waste constituents, a description of land and water management practices that may affect groundwater quality, and the adequacy of the available data establishing baseline conditions for the subbasin. The groundwater quality descriptions are organized as follows. Large subbasins in the Sacramento Valley are discussed first in alphabetical order, followed by the small basins peripheral to the Valley in alphabetical order. Basins in the San Joaquin and Tulare Basins are listed in alphabetical order.

General Sources of Information

Sources of information for each subbasin primarily include reports and data from the DWR, California Department of Pesticide Regulation (DPR) and USGS. Specifically, land use data came from the DWR land use surveys conducted periodically throughout California. DWR 2004 Bulletin 118 was the primary source of information for subbasin hydrogeologic and physiographic descriptions. Several USGS reports provided information about concentrations of constituents in several basins. Recent USGS reports from the National Water Quality Assessment Program provided information about probable processes affecting groundwater quality in specific areas of the various basins.

Other literature was reviewed and cited that provided understanding about agriculturally related processes affecting groundwater quality in general and for specific subbasins. This included peer reviewed journal articles and preliminary data and reports from the Groundwater Ambient Monitoring Assessment (GAMA) Project funded by the State Water Board. Reports were obtained from the State Water Board website that were helpful in understanding processes and travel times for groundwater to reach well screens for specific areas.

Groundwater Quality Summary

Recent studies as part of the GAMA Program provide some insight about the physical processes affecting waste constituent movement in Sacramento River Basin groundwater. The primary objective of the GAMA Program is to assess the water quality and to predict the relative susceptibility to pollution of groundwater resources throughout the state of California.

The results of the investigations reported here are consistent with conclusions drawn in the GAMA Program of relatively localized evidence of groundwater pollution in the Sacramento Basin. This also holds true for detections of pollution in the San Joaquin and Tulare Lake Basins as well.

Pesticide detections in groundwater in the Sacramento River, San Joaquin River, and Tulare Lake Basins are generally limited to a small number of compounds (DPR 2003). These detections are related to physical and chemical properties of soils and the specific compounds, water management, and spatial and temporal variability of pesticide application and soil-water processes and properties. Data on transport of pesticides in groundwater highlights additional issues due to legacy pesticides that will need to be

addressed during development of the long-term irrigated lands regulatory program. There are also difficulties in assessing the effects of groundwater pollution based on the relatively long period of time before pesticides used on irrigated agriculture begin to be detected in groundwater.

IRRIGATED LANDS MANAGEMENT PRACTICES

Management practices, best management practices, and management measures are all various ways of describing how growers and other responsible parties pursue stated objectives. In some cases, a practice or group of practices is pursued solely to lower production costs. In other cases, a practice is implemented to address a specific objective, such as a reduction in storm water discharge. For this discussion, it is assumed that the implemented management practices are intended to reduce or eliminate negative impacts on water quality.

Actions taken to prevent or reduce impacts on water quality include physical and operational changes (management and policies) as well as educational efforts. Physical changes include modification of irrigation and drainage systems at both the on-farm and district level. Typically, infrastructure improvements are accompanied by operational or management changes. At the district level, operational changes include implementation of delivery policies that enable more flexible on-farm water use and restrictions on return flows and drainage. At the farm level, a great number of actions can be implemented to reduce impacts on water quality, as discussed in further detail in this section.

WETLAND MANAGEMENT PRACTICES

The total acreage of managed wetlands in the Central Valley Watershed from Modoc National Wildlife Refuge (NWR) in the north to Kern NWR in the south is about 144,000 acres. These wetlands are principally located in the lower elevations of the various subbasins in which they occur. These low areas have traditionally served as the receiving lands for return flows from upland water users.

Water quality has been a concern of wetland managers for more than 50 years. This concern, however, was focused on water being used to manage wetlands rather than waters being discharged to downstream rivers. As a result, limited information is available about the water quality of wetland discharges. The majority of the available information is for wetlands in the Westside San Joaquin River Subbasin; San Luis NWR; Grassland Resource Conservation District (RCD) and Volta, Los Banos, and North Grassland Wildlife Areas (WA).

The Central Valley Project Improvement Act (CVPIA) has resulted in a beneficial effect on water reliability, quality, and management for a major portion of Central Valley wetlands. For the most part, the quality of water available for wetland management has improved. Wetlands nationwide have been known as natural filtering systems for many constituents; it is anticipated that, over time, the wetlands' authorized supplies for the CVPIA also will result in improved quality of return flows.

The management practices that are utilized by wetland managers are essentially uniform throughout the Central Valley. The primary management objective is to provide quality wetland habitat for migrating and wintering populations of migratory birds, primarily waterfowl and shorebirds. Therefore, management practices are focused on meeting that objective. The principle type of wetlands managed are seasonal wetlands, either irrigated for waterfowl food production (swamp timothy/watergrass) or non-irrigated.

Irrigated seasonal wetlands receive water one to three times between April and June each year, depending on the food plants desired and geographic location of the area. These wetlands, along with non-irrigated seasonal wetlands, are then flooded in early fall and maintained through the winter until February or March, when they are gradually drawn down to achieve desired soil temperatures for germination of desired food plants.